

FIRST ANNUAL REPORT

OF THE

DIRECTOR

OF THE

New York State Pathological Laboratory

OF THE

UNIVERSITY OF BUFFALO.

TRANSMITTED TO THE LEGISLATURE JANUARY 26, 1899.

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IN ASSEMBLY,

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New York State Pathological Laboratory of the
University of Buffalo

For the Year 1898.

Respectfully submitted to the Legislature of the State of
New York, by

ROSWELL PARK,

Director.

REPORT.

The following report of the expenses and operations of the State Pathological Laboratory, located at present in and operated under the auspices of the Medical Department of the University of Buffalo, is herewith respectfully submitted. This laboratory was organized under the provisions of an item contained in the supply bill of the last Legislature, appropriating \$10,000 for the purpose of "equipping and maintaining a laboratory to be devoted to the study of the causes, mortality rate and treatment of cancer," said money being appropriated to the Medical Department of the University of Buffalo. So soon as this appropriation became available the faculty of said medical department appointed me director of the laboratory and authorized me to proceed at once with its organization, offering it such accommodations as might be needed for its work within the building occupied by the medical school. Immediately complying with this authority, I first secured the services of Dr. H. R. Gaylord, an expert in pathology, well known on both sides of the ocean, and arranged with him to take charge of the work in pathology and temporarily in that of bacteriology. The finest instruments known to science were ordered from different makers at home and abroad, a collection of books bearing upon the subject was begun and the rooms offered us by the University were furnished in such manner as to permit of carrying on the work. Later, about November 1st, Dr. H. D. Pease, formerly in the laboratory of the health department in the city

of Philadelphia, was added to the staff and placed in charge of the bacteriological work. There is no man in the country more competent to pursue this work than is he. As assistants in the prosecution of the study, Drs. F. C. Busch and N. W. Wilson have been engaged part or all of the time. A stenographer, an assistant and a janitor comprise, along with the director, the entire working staff. The salaries for this work during this time until February 1, 1899, amount to \$4,238.33; the equipment of the laboratory, including all that has been spent for apparatus of all kinds, books, etc., has cost, up to February 1, \$2,630.87; the current expenses during this time amount to \$1,503.58.

Thus, up to February 1, 1899, the entire cost of conducting this laboratory has been \$8,372.83. The expenditures, as itemized, are tabulated as follows:

	Salaries.	Equipment.	Stock and current expenses.	Total.
May — June	\$480 49	\$289 63	\$443 34	\$1,213 46
July	383 66	237 89	59 17	680 72
August.	430 32	859 98	83 25	1,373 55
September.....	430 32	415 45	81 56	927 33
October	430 32	3 00	217 57	650 89
November	733 31	290 39	184 86	1,208 56
December	684 98	409 19	214 80	1,308 97
January	664 98	125 34	219 03	1,009 35
Total.....	\$4,238 38	\$2,630 87	\$1,503 58	\$8,372 83

Under stock are included such chemicals and supplies as are best purchased in bulk and which must necessarily be kept on hand, but which are constantly drawn upon and which will be ultimately exhausted and require renewal.

Under current expenses are included such supplies as must be purchased from day to day, as animal food, animals, meat, etc.

Permament equipment includes all apparatus and instruments which are only subject to possible injury and general deterioration, furniture, etc.

NEW YORK STATE PATHOLOGICAL LABORATORY
OF THE
UNIVERSITY OF BUFFALO.

ROSWELL PARK M. D., Director.

H. R. GAYLORD, M. D., Associate.

The medical department of the University of Buffalo have great pleasure in announcing that during the spring of 1898 the Legislature of the State of New York appropriated a sum of money to this department for the purpose of "equipping and maintaining a laboratory to be devoted to the study of the causes, mortality-rate and treatment of cancer." This laboratory is now being conducted under the supervision of this department. Its existence is amply justified by the difficulty of the problems involved, the evidently increasing death rate from this disease, and the impossibility of studying it successfully by purely private means. The laboratory is equipped with every possible facility for investigating the disease, both in its clinical and pathological aspects.

The officers of the institution invite correspondence with physicians throughout the country in regard to statistics and all matters connected with this study; they also desire to secure reprints of all monographs pertaining to this subject for its library. They furthermore particularly wish to learn the names, addresses and, so far as possible, the methods in use, of the various quacks, charlatans and institutions advertising as curing this disease. Such correspondence will be regarded as absolutely confidential, if so requested.

It is desired also to secure specimens of tumors from all varieties of the lower animals, either gross specimens or fragments for microscopical examination. These should be sent securely packed, the former immersed in weak alcohol or formaline solution, the

latter in pure alcohol, and will be gratefully acknowledged, or even paid for in exceptional instances.

The coöperation of the entire profession is urgently solicited in this study, in order that it may be made more thorough and more complete.

During the summer of 1898 some 18,000 circulars, one of which is printed above, were distributed generally among the profession, mainly of this State. In this way, as well as through many of the medical journals, physicians throughout the State were invited to send specimens to us for examination and diagnosis. This is in order that diagnosis may be made much earlier than it often is, that patients may be given the benefit of the same, and is all in the direction of earlier recognition of this disease, if possible at a time when there is still a remedy for it in sight. Just in proportion as we can extend our sphere of usefulness in this way one of the most important functions and objects of the laboratory will be achieved. There is no reason why thousands of examinations of this kind may not be made if the physicians of the State would avail themselves of the opportunities here offered. This is, moreover, intended especially for those who are unable to afford such examinations when paid for at usual rates. It is intended, in other words, to institute a system here similar to that which prevails in various public laboratories in the great cities where examinations are made free of charge for diphtheria, tuberculosis, etc. We seem to be on the point of being able to prove that cancer is a parasitic, possibly even an infectious disease. For reasons, then, of public safety, studying the welfare of the greatest number, it is of the greatest humanitarian as well as economic importance that somewhere such examinations of suspected cancer specimens can be accurately and reliably made. What may

be done in this direction is, perhaps, fairly exemplified in the laboratory of Prof. Orth, in Gottingen, where in twenty years some 2,300 specimens from suspected cancer of the uterus have been examined, with error in diagnosis in only three instances. What this all means to a given patient may be easily left to the imagination. The effect of this work, the value of the training which its performance gives to those engaged in the work and the extraordinary competency which is thus acquired might well be elaborated upon.

In the following tables it will be seen that there is a relative decrease in the mortality rate of consumption, which has steadily declined since the discovery of the peculiar germ to which it is due, a discovery made in 1881. Since the cause of this scourge of humanity has been known, intelligent and properly directed efforts have been able to very markedly decrease its ravages. On the other hand, the death rate from cancer is steadily increasing, not alone in New York State, but apparently in all parts of the world. This increase will undoubtedly continue until its minute causes are much better known, or positively determined. At present the research work of this laboratory is directed particularly toward this determination, and the work done even during the past few months would seem to indicate that we are laboring in the right direction. It is too early to make any detailed or scientific report beyond the general statement that already we have repeatedly succeeded in reproducing the disease in animals by inoculation from human patients, and are studying in the most earnest possible way the nature of the agent which can thus communicate it. Even though the rate of infant mortality has been reduced by modern sanitary measures, it appears from the tables

that more people die now of cancer at the so-called cancer age and fewer of old age than ever before.

Thus it can be plainly demonstrated that cancer is the only disease which is now positively and steadily upon the increase. There is need, moreover, for an entirely new department in this work. This comprehends the equipment of a laboratory in which investigations in physiological chemistry can be conducted for the purpose of examination of the blood, the secretions and fluids of the body, etc., in order to determine whether it may not be possible to recognize cancer of the internal organs before it begins to manifest itself by symptoms implying wide spread of the disease; in other words, at a time when there may still be an opportunity to saturate the system with some protective drug. The expense of equipment of such a department would be very small, a few hundred dollars sufficing. The salary of an expert would, however, be required, with, perhaps, that of an assistant. A series of most interesting and instructive investigations of this kind was carried on in Zurich, in 1895, by Moraczewski, but for only a short time and during a short time as incidental to other work. He has, however, abundantly shown what can be accomplished in this direction, and indicated a path to follow.

In time past there has been a lack of concerted action on the part of the profession in reporting and classifying tumors and in assigning deaths really due to them to their proper places. Undoubtedly, many deaths due to cancer have not been included under this head. An accurate statistical table would, therefore, necessitate extensive correspondence, which is out of the question. So necessary is proper and intelligent classification that the American Public Health Association at a recent meeting passed a resolution

binding itself to every effort toward this desired uniformity, offering to furnish blanks and instructions to physicians generally. When this is done, and deaths completely reported, the resultant figures will be found to be appalling. The American Surgical Association have also a special standing committee whose duty it is to study this subject and report annually upon the progress of their work. Thousands of deaths annually, doubtless due to cancer, are reported under that vague general heading "Deaths from other causes," the average general practitioner not being equipped with the apparatus by which accurate examinations of tumors, discharges, etc., can be made.

The progressive medical journals, both of this country and abroad, have since the establishment of this laboratory devoted much space to the general subject of cancer and cancer mortality. All agree that the question is a most serious one. An editorial in the New York Medical Record for November 5, 1898, stated that cancer was worse than consumption, that it is on the increase all over the world and that especially in this State it is startlingly increasing. In England and Wales, in 1840, there were 2,786 deaths from cancer, i. e., one to every 5,646 of the population, and one out of every 29 deaths. In 1896 there were 23,521 deaths from cancer, or one out of every 22 deaths, or, again, one to every 1,306 of the population. That is, the proportion of deaths to-day is nearly five times greater than it was fifty years ago. In the United States the increase is quite as alarming. The figures relating to New York State show a steady increase quite incompatible with the increase in population. In the comparison made below consumption has been chosen because it is perhaps the most widespread of all diseases, and the most generally dreaded, con-

sequently the most suitable for comparison. The figures used below are taken entirely from official sources, i. e., the reports and bulletins of the State Board of Health.

TABLE I.

(Monthly death rate from cancer in New York State for the past ten years).

This table illustrates how mortality from cancer has progressively increased.

	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1898.
January	178	203	194	277	230	295	260	258	290	302
February	149	193	183	209	205	232	218	227	281	303
March	197	204	228	235	283	276	303	262	312	316
April	207	186	222	220	271	240	304	298	282	320	333
May	191	211	227	273	248	270	286	265	270	326	375
June	190	237	222	237	224	248	241	307	275	290	367
July	227	210	227	242	239	266	300	296	312	349	380
August	199	227	254	236	257	279	283	295	357	294	390
September	232	198	206	236	289	280	268	268	277	306	378
October	207	232	238	238	259	263	273	298	319	323	376
November	178	164	199	208	237	244	242	262	263	330
December	208	232	238	257	296	259	254	269	306	330

When, now, we compare cancer and consumption for the same years we find the increase standing as in

TABLE II.

(Comparison between cancer and consumption.)

	Cancer.	Consumption.
1887.....	2,363	11,609
1888.....	2,497	12,383
1889.....	2,638	12,390
1890.....	2,868	13,831
1891.....	3,028	13,445
1892.....	3,152	13,471
1893.....	3,232	13,123
1894.....	3,285	12,824
1895.....	3,554	13,267
1896.....	3,789	13,265
1898*.....	4,456	12,552

This table shows a constant and progressive increase in the cancer mortality year by year, while in the consumption column the mortality figures vary, those for 1898 being lower than for any of the previous eight years.

In the following table is shown the average monthly mortality of cancer and consumption for the past eleven years. Here, too, will be noticed a progressive and constant increase in the cancer column and a wide variance in figures in the consumption column.

TABLE III.

(Average of mortality by months from cancer and consumption.)

	Cancer.	Consumption.
1887	196.90	966.53
1888	208.00	1,031.75
1889	219.83	1,032.50
1890	239.00	1,152.58
1891	252.33	1,120.42
1892	262.66	1,122.60
1893	269.33	1,093.40
1894	275.41	1,068.66
1895	296.17	1,105.58
1896	315.75	1,105.41
*1898	371.28	1,071.00

*The average for 1898 is based on reports for seven months. These seven months' figures are the following:

TABLE IV.

(Monthly average death rate for 1898.)

	Cancer.	Consumption.
April	333	1,100
May	375	1,127
June	367	1,007
July	380	1,116
August	390	1,019
September	378	1,076
October	376	1,052

Comparing the monthly averages for the same months for the ten past years we find figures as given in

TABLE V.

	Cancer.	Consumption.
April.....	-----	-----
May.....	276	1,115
June.....	265	988
July.....	277	1,038
August.....	287	1,035
September.....	265	986
October.....	280	1,048

Studying now the figures as compared with population, the latter, as given in the ensuing table, are based upon the United States census reports for 1880 and 1890 and upon the State census for 1892. Increase of population is estimated at 100,000 per year from 1887 to 1890, and at 125,000 per year from 1890 to 1899. In this table the figures under cancer and consumption respectively indicate that one death from cancer or consumption has occurred in the number of the population printed. Thus, in 1887 one person in every 2,412 died of cancer and one of every 499 of consumption. The table also shows an increase of 40 per cent. in cancer during the eleven years tabulated. In other words, in 1887 one out of every 2,400 died of cancer, in 1898 one out of every 1,500. The same table shows that the mortality rate from consumption has exhibited a marked decrease.

TABLE VI.

AVERAGE OF DEATHS FROM CANCER AND CONSUMPTION TO THE
TOTAL NUMBER OF THE POPULATION.

YEAR.	Population.	Cancer.	Consumption.
1887	5,700,000	2,412	499
1888	5,800,000	2,362	468
1889	5,900,000	2,239	476
1890	6,000,000	2,096	433
1891	6,125,000	2,022	455
1892	6,250,000	1,980	464
1893	6,375,000	1,972	486
1894	6,500,000	1,966	507
1895	6,625,000	1,862	499
1896	6,750,000	1,731	508
1898*	7,000,000	1,568	544

The population figures are shown in—

TABLE VII.

(Estimate of Population.)

1880	5,082,871	United States Census.
1890	5,997,853	United States Census.
1892	6,513,344	State Census.
1899	7,000,000	State Board of Health Estimate.

That this increase in cancer mortality is not due to improvements in methods of diagnosis is apparent. In fact, the reverse is nearer the truth, since many cases which were formerly diagnosed as cancer are now properly classified where they belong. Nor can the increase be explained by the assumption that the average age of the population has advanced, for in these days of specialism and progress modern life-saving is largely confined to the earlier years. The number of deaths of men under 35 and women over 45 has remained stationary. Deaths from old age have decreased, more people dying of cancer before they reach this age.

In none of the diseases tabulated by the State Board of Health, nor in any Government reports, has there been such an immense increase as in cancer. It is the only disease tabulated which shows a progressive and steady increase by weeks, months and years. Yet the world in general is ignorant of the awful array of these ever-increasing figures.

At the present rate at which this disease is increasing (and basing the estimate on figures for the past eleven years the averages are unchanged) it can be plainly seen that *ten years from now cancer will be claiming annually in New York State more victims than consumption, small-pox and typhoid fever combined.*

Contrast the above figures for this State with some others from other parts of the world. In 1889 there were 18,654 deaths from cancer in England, being 3.6 per cent. of the entire death rate for that year. In 1893 there were in London alone 3,412 deaths from this cause, making a percentage of 3.73 of the entire death rate. In Berlin, in 1892, there were 1,838 deaths from cancer, the rate being 3.48 per cent., while fifteen years previously it had been only 2.10, showing an increase of 1.38 per cent. in fifteen years. In Vienna the percentage of deaths from cancer in 1890 was 4.96, showing an increase of 0.84 in eight years. In Paris, in 1893, cancer caused 4.61 per cent. of the total deaths. Other cities in this country show increase as follows: Philadelphia, 0.26; Boston, 0.54; Baltimore, 0.65; New Orleans, 0.52; San Francisco, 0.84; all during the past ten years.

Showing how cancer is particularly prevalent in certain regions, we may take, for example, the recent report of Dr. Symons,

medical officer of Bath, England, who has found that in his territory cancer is 50 per cent. more frequent than in neighboring localities, and is increasing. There are also the extraordinary topographical and statistical studies of Behla, pertaining to the little town of Luckau, in Germany, where, within the past twenty-three years, there have been 73 deaths from cancer in an area covered by two or three city squares, as many as four deaths from cancer occurring in one house, where the disease has assumed the proportions and importance of an endemic. Similar endemic appearances of the disease have been noted in other parts of the world, and in mild form may be said to have almost prevailed in time past in certain localities in western New York.

These statements and statistics afford, it would seem, most convincing and unanswerable argument why the disease should be studied officially and at public expense. The problem as to the nature of cancer is the most important, and at the same time the most difficult of solution, of the many practical problems now before the medical profession. The causes of nearly all of the commonly known infectious diseases have been definitely established, and the value of the knowledge thus gained has been simply incalculable, since knowledge as to how to prevent them is now at hand, and their actual prevention depends rather on the enterprise and intelligence of the people generally. But this particular disease which kills thousands of people annually in this State, which affects seriously the domestic animals, and which, in another expression (for cancerous tumors destroy a large proportion of trees), is a serious economic disturbance, and which on this account might well

be studied by the Forestry Commission, has so far baffled the ingenuity and the ceaseless efforts of individuals for centuries. Surely had the problem been one capable of solution by individual effort it would have long ago been solved. As it is, however, it is necessary to study it from various directions, in an institution equipped with the best of talent and the most accurate instruments and apparatus, and from the side of the clinician, the pathologist, the bacteriologist and the chemist, as well as, perhaps, from the standpoint of the statistician, the geologist and the botanist. To illustrate the latter point first, a careful statistical study will show where the disease prevails in its most pronounced form, and it may be that the researches of the geologist and the botanist will show the nature of the soil which furnishes the drinking water, or the vegetables, cereals and fruit which, raw or cooked, furnish the vegetable food of the inhabitants. As indications point more and more strongly toward the parasitic nature of this disease, we must investigate the air, the drinking water, the food and the surroundings in order that the parasite, when discovered, may be avoided.

Coming now to the more purely medical side of this matter, it is the general practitioner who first comes in contact with these cases, and it is the general practitioner who is most often puzzled with regard to early diagnosis. It is first evident that if a successful remedy for cancer is ever to be evolved, it would be necessary to see it early, rather than late, in order to attain success. Early employment of such ideal remedy means early diagnosis, and this, at present, is a matter of the greatest difficulty. Every means, therefore, which can be placed at the dis-

posal of the medical profession by which early recognition can be facilitated is a step in the desired direction. If sufficient help in this direction be afforded it is intended to furnish to any physician in this State who desires it, directions for preparing and forwarding to this laboratory specimens of tumor, discharge or excretion for examination with regard to the possibility of cancer, and to do this free of charge in all desired cases. In this respect this State Laboratory would be much like the laboratories maintained by various city health departments, to which are sent cultures made from diphtheria, tuberculosis, etc., for examination. The co-operation and assistance of physicians throughout the State has been already invited by means of circulars similar to that already copied, of which some 18,000 were sent out during the past year. If the physicians of New York State will but help in this matter this Laboratory may be a means of doing great good in this direction, though it should accomplish nothing else, because nineteen out of twenty of the physicians are not equipped with the necessary apparatus and technical skill to do this work as it must be done to be accurate.

The problems before the bacteriologist and the pathologist in this investigation are most complex and perplexing. Already, however, in this laboratory, as in instances in other parts of the world, it has been possible to make numerous successful inoculations of cancer from man to animals. The nature, however, of that agent, whatever it may be, which thus can communicate the disease, is by no means definitely established, and has so far resisted the most painstaking study. It must necessarily be some living agent, however, and capable of cultivation upon something; and it is part of our work to discover the conditions which make

its growth possible and to study its life history. Only a certain amount of familiarity with the general difficulties attending this line of research can acquaint one with the peculiar difficulties surrounding this particular problem. We hold it, however, to be established that cancer is both a communicable and a parasitic disease, and feel that with patience and scientific effort the nature of the communicable agent can some time in the future be determined.

The investigation and pursuit of this parasite, or these parasites (since probably there are several), must take the pathologist of this institution into hitherto unexplored and unfamiliar fields. The amount of time required in, as it were, chasing the different organisms through their life histories and peculiarities is to the uninitiated astonishing. But there are many side lights which must be shed upon the principal problem in which we are engaged. For this purpose, as already intimated, the clinicians must furnish the material, the pathologists must investigate it with the microscope and record their observations with photographic apparatus; the bacteriologists must study it with their culture methods, while the physiological chemists must have access to patients at all times in order to examine the blood, the urine and other fluids, and see what changes occur at various times and under various conditions. All of this means three different laboratories; namely, the pathological, the bacteriological and the chemical, whose chiefs are working in closest harmony with the clinician, who comes in daily contact with the patient.

With regard, now, to our actual needs and necessities for the future, these comprise, first of all, more space, and much more space if the work is to be properly carried on. The accommoda-

tions requisite for this purpose, especially if results obtained are to be demonstrated, call for a small building whose total expense should not exceed \$25,000. With such a building, the finest research laboratory in the world could be properly housed and accommodated.

This building being provided could be maintained for the ensuing year at an expense probably not to exceed \$15,000, including therein all legitimate expenses of any building, with salaries of chiefs and assistants, further equipment and the beginning of a collection of special works in various languages, bearing upon this subject. Consequently, we request your honorable body to afford us the means of carrying on the work above asked for, and for the specific purposes herein set forth, feeling that the intrinsic importance of the subject and the vital interests of citizens of the Empire State, justify any reasonable expense by which may be learned first the nature, and later the means of mitigating, if not curing, the most serious and perplexing disease now known to the medical world.

It may be proper to say that the investigations and results furnished from this laboratory have been, and shall hereafter be furnished from time to time to the high-class medical journals of this country and Europe, to be collected and published by the State if the Legislature deem best. The channel through which such information is usually furnished to the medical profession is that already adopted, as above, but there would be the best of reason for collecting and printing these papers in separate form by themselves. As illustrative of work already done in this laboratory and in this direction, I would mention a paper on "Syncytial Tumors," by Dr. H. R. Gaylord, published in the American Journal of Ob-

stetrics, Vol. 38, No. 2, 1898, and a paper on the "Etiology of Cancer," published by the director in the American Journal of the Medical Sciences for May, 1898, copies of which are to be had on application.

I have hardly thought it necessary to go into the minutiae of the scientific work of this laboratory, feeling that this was hardly the time at which to submit a technical scientific report. I can only say in closing that the most eminent scientific men of this country have already expressed themselves as deeply interested in its work, and hopeful of future results from its operation. I know not how to make a stronger appeal for continuance and augmentation of support than I have submitted in simple untechnical language in the foregoing statements. Summarizing them all, I will say in closing, that according to the census returns of the United States Government, western New York lies in an area, of which Buffalo is nearly the geographical centre, where the death rate from cancer is higher than in any other part of the country, and that, as I have shown by quotations from the State Board of Health returns, this rate is increasing not only in the western part of the State, but everywhere. Can there be any more eloquent argument or any fitter object for public aid than this which I have the honor to respectfully submit?

